

# Source Considerations and Source Water Protection

# **Purpose of the Ground Water Rule**

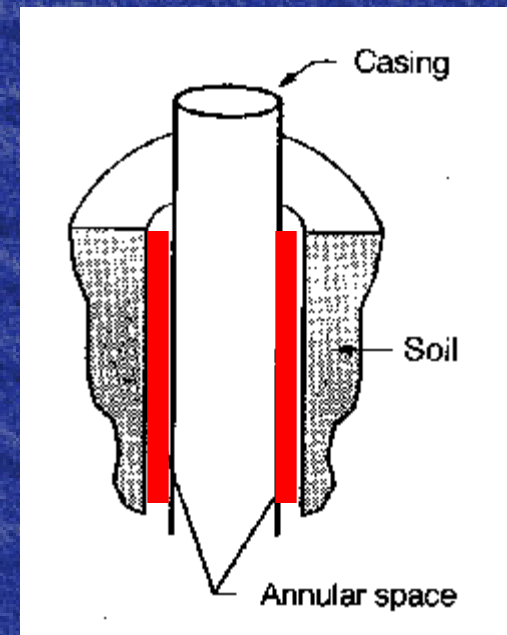
Provide increased protection against microbial pathogens in public water systems (PWS) that use ground water (GW) sources.

# Sources at Risk

- Well construction
- Hydrogeology
- Proximity to potential sources of fecal contamination

# Well Construction

- Must comply with §290.41(c)(3) regulations
  - Driller's log
  - Sanitary control easement
  - Proper casing
  - Annular cement (pressure)
  - Sealing block, security, proper grading





# Hydrogeology

- Well depth, confining layers
- Well location
- Aquifer type

# Well Depth

- Shallow wells may provide little attenuation
- Lack of sufficient confining layers that provide a barrier for vertical migration of contaminants
- Little or no soil

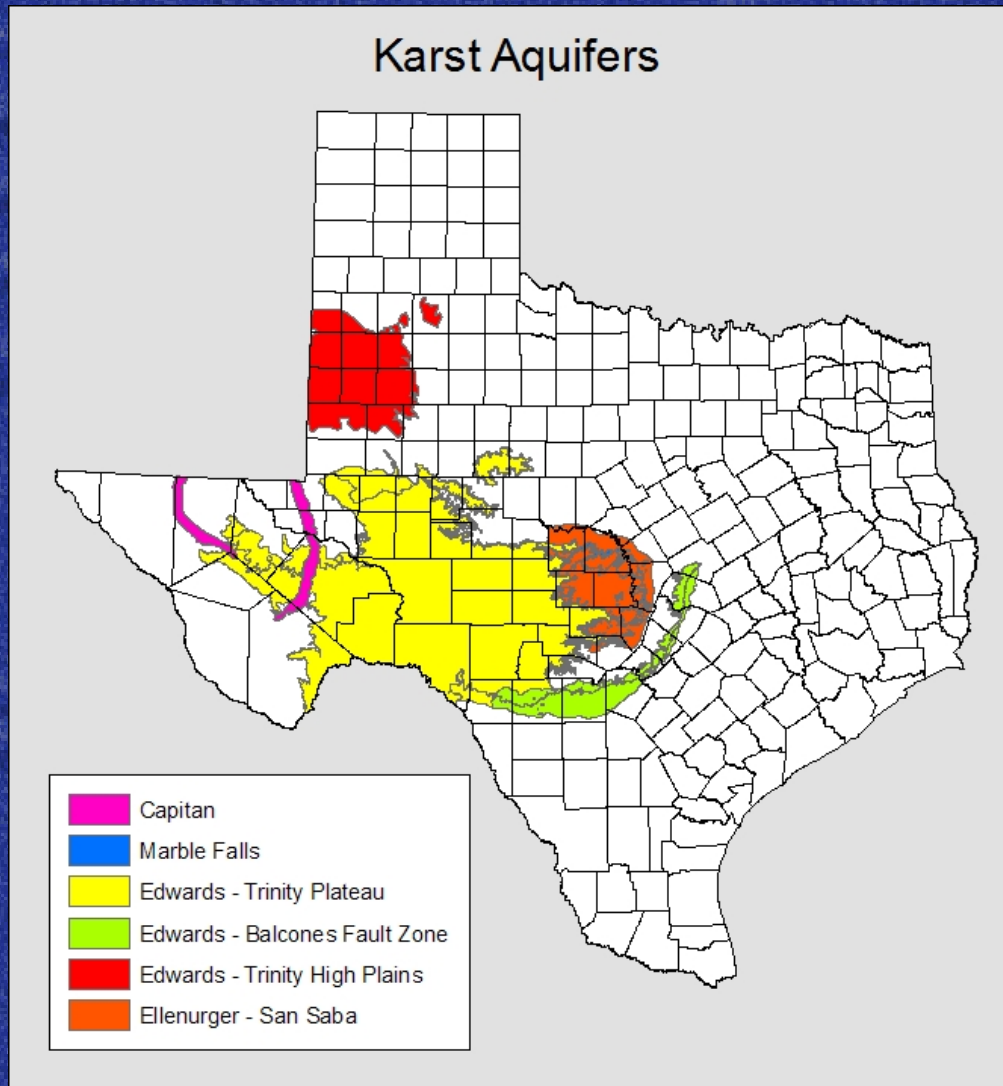
# Well Location

- Distance to surface water features
  - Lakes, rivers, streams
  - Flood plain





# Karst Aquifers

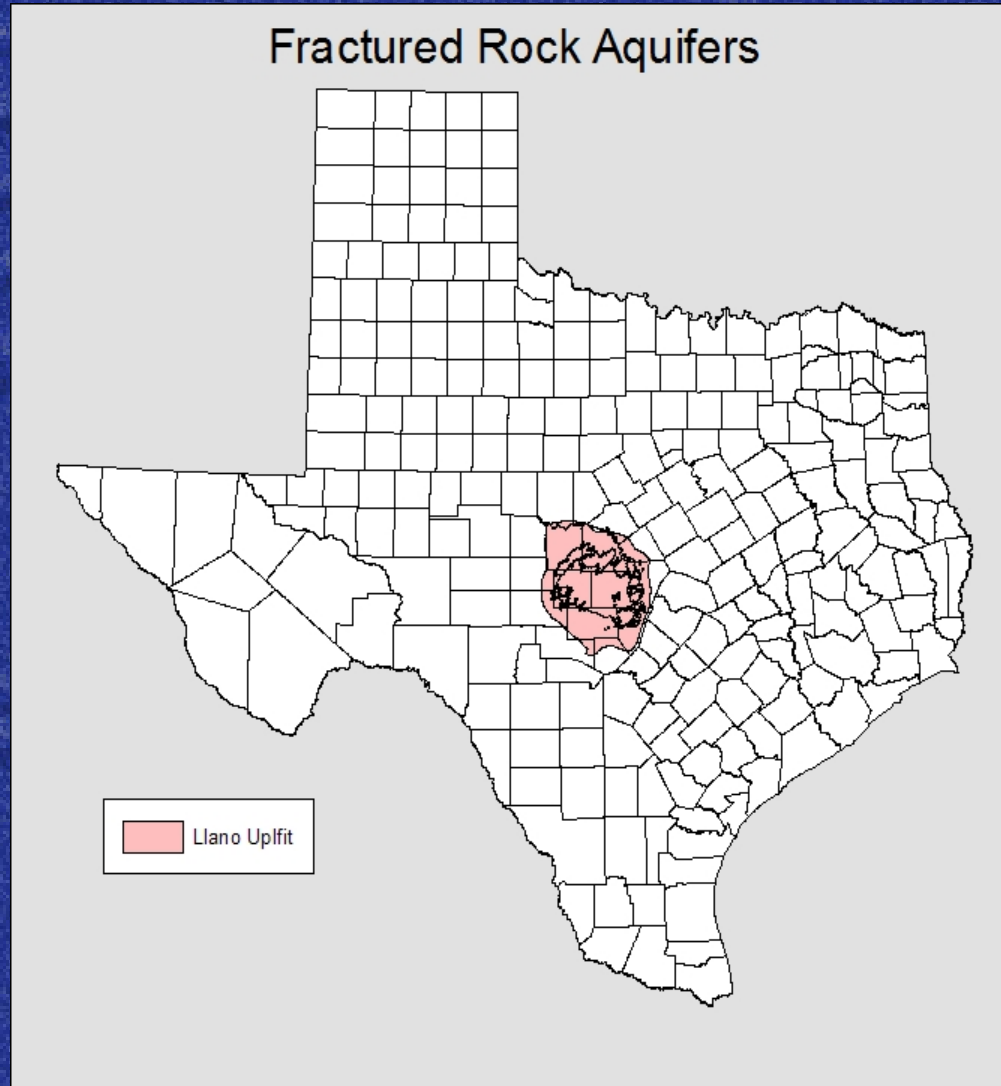




# Karst Aquifers

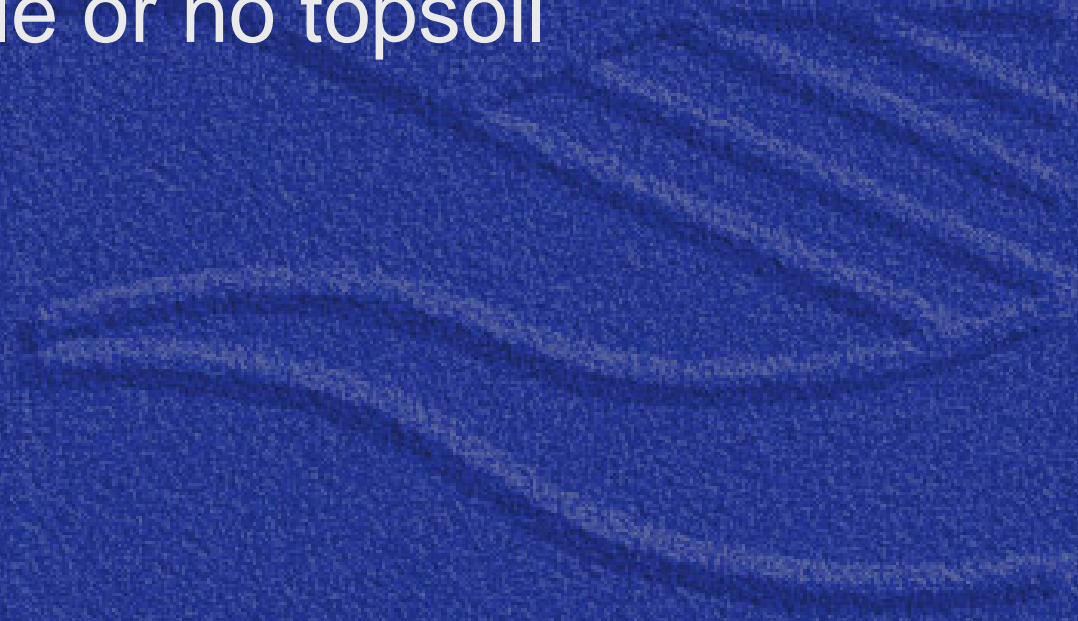
- Limestone and dolomite
- High porosity due to solution cavities and fractures
- Little or no topsoil
- Large surface recharge features

# Fractured Rock Aquifers



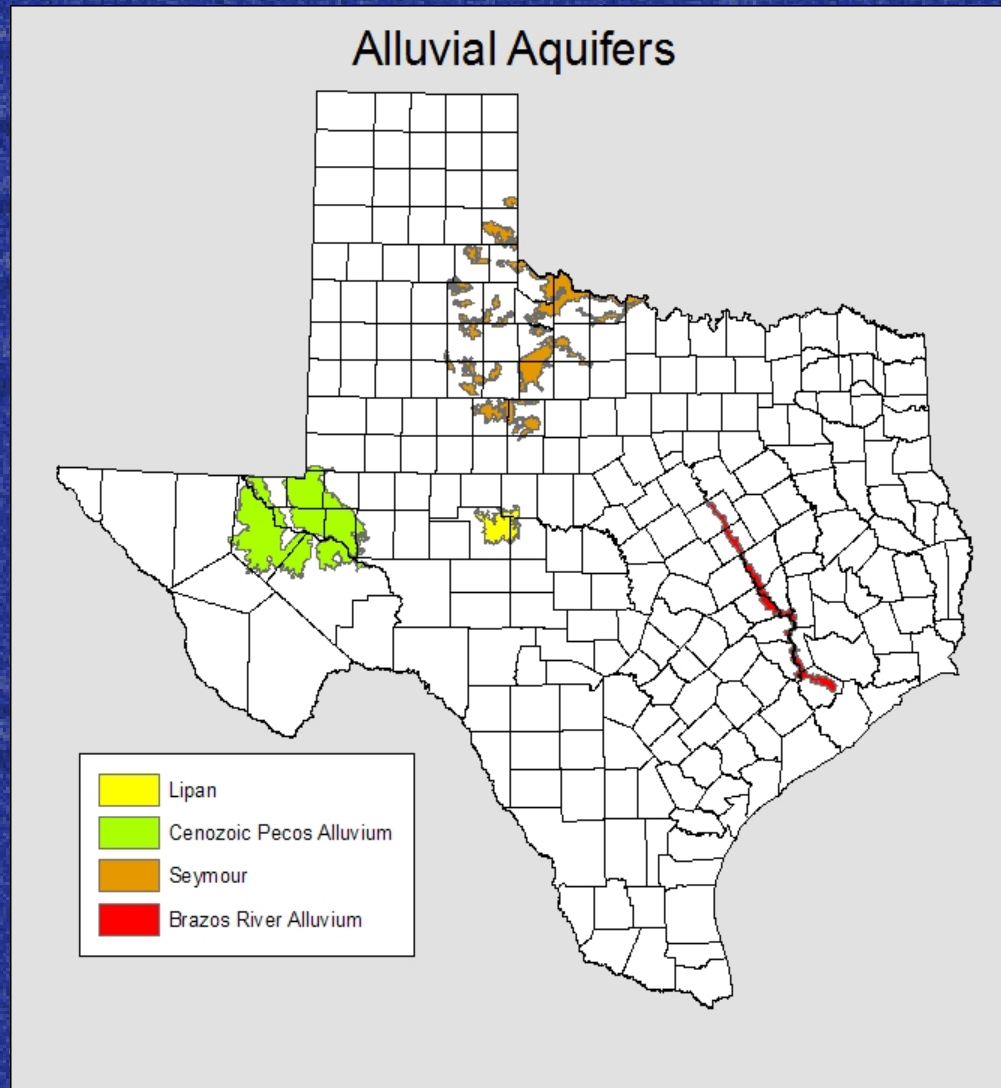
# Fractured Rock Aquifers

- Fractured bedrock
- High porosity due to fracturing
- Little or no topsoil





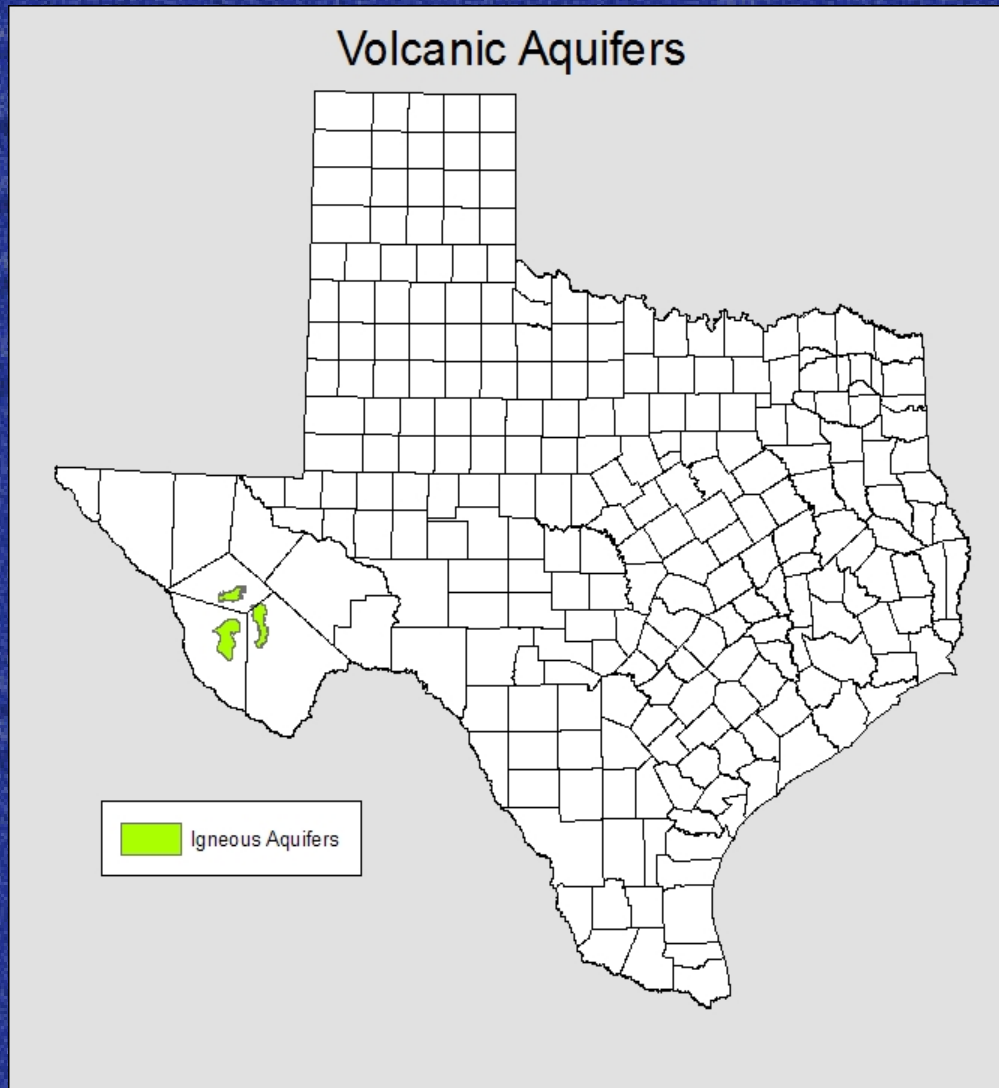
# Alluvial Aquifers



# Alluvial Aquifers

- Sand, gravel, clay
- Highly variable porosity
- Generally shallow wells
- Often near surface water

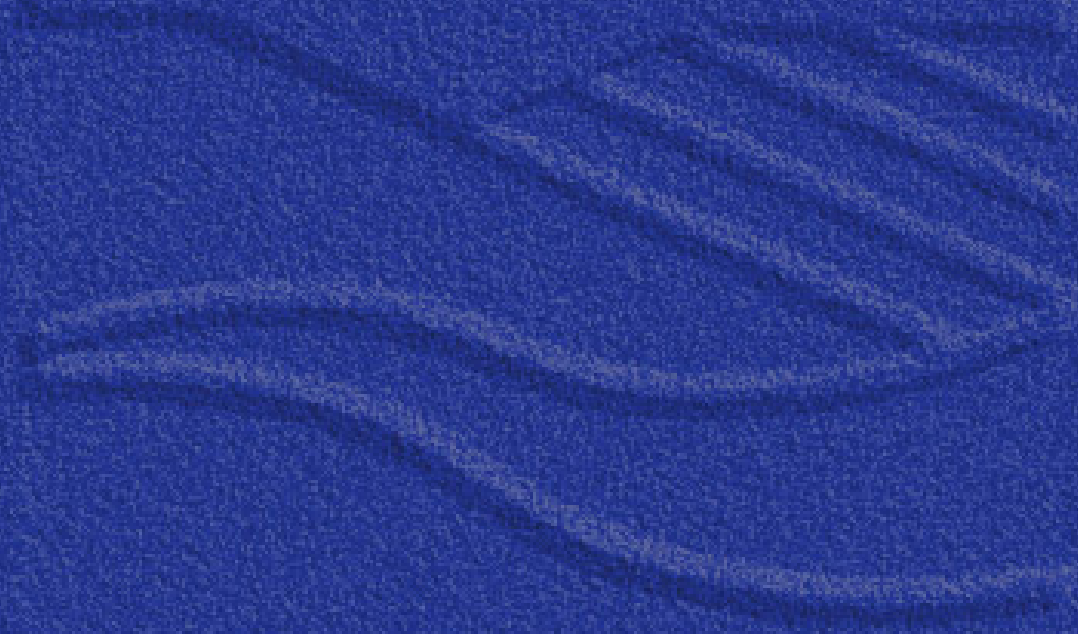
# Volcanic Aquifers





# Volcanic Aquifers

- High porosity, complex systems
- Little or no topsoil



# Potential Sources of Contamination

- Point source
  - Below ground
  - Above ground
- Non-point source
- Other

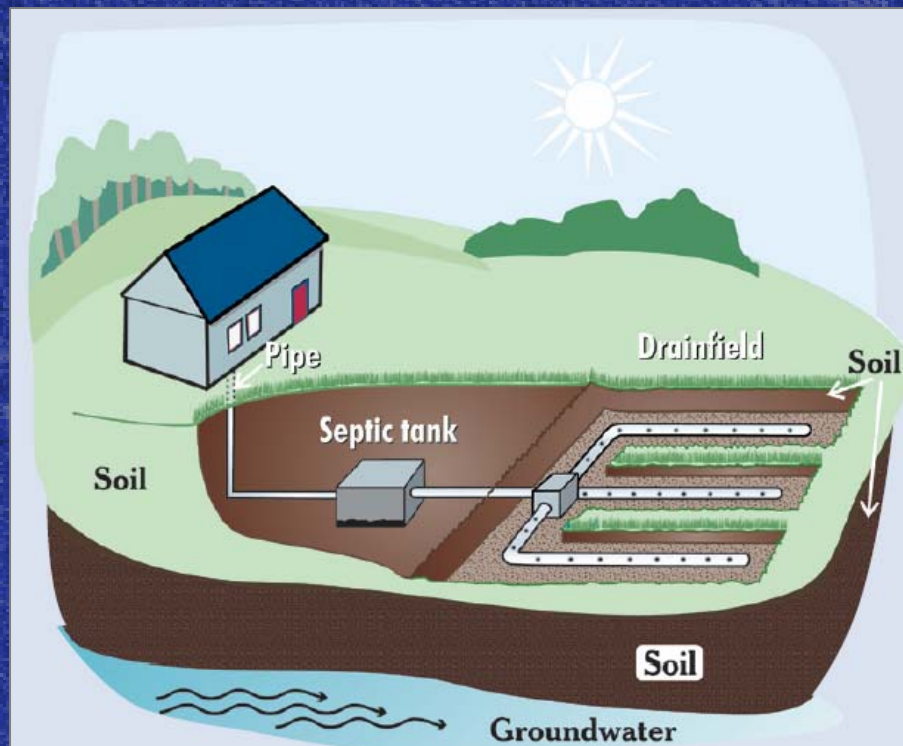
# Potential Sources of Contamination

- Septic systems
- Animal feeding operations
- Sludge application
- Sewage treatment plants
- Surface water bodies
- Abandoned wells



# Septic Systems

- Septic systems can leach harmful bacteria to the groundwater



# Animal Feeding Operations

- Highly concentrated source of fecal contamination
- Lagoons can potentially leak/overflow if not properly constructed/maintained



# Abandoned Wells

- Act as a conduit for contaminants to enter the aquifer





# Source Water Protection

- Survey potential sources of contamination
- Make system aware of activities around wellhead that can lead to contamination
- Recommend best management practices to eliminate/reduce risk
- Provide financial assistance